

<b>Biology</b>	<b>Group-I</b>	<b>Paper-I</b>
<b>Time: 1.45 Hours</b>	<b>(Subjective Type)</b>	<b>Marks: 48</b>

**(Part-I)**

**Q.2. Write short answers to any FIVE (5) questions: (10)**

- (i) Describe vegetative organs of plants with two examples.

**Ans** Vegetative organs of plants are those organs which do not take part in sexual reproduction of the plant. For example, root and stem.

- (ii) Write the definition of Bio-Chemistry.

**Ans** It deals with the study of chemistry of different compounds and processes occurring in living organisms. For example, study of photosynthesis and respiration.

- (iii) What is meant by bio-informatics?

**Ans** Bio-informatics refers to the computational and statistical techniques for the analysis of biological data.

- (iv) Differentiate between deduction and theory.

**Ans** Deduction is the logical consequences of hypothesis. The hypothesis that stands the test of time (often tested and never rejected) is called theory.

- (v) Define species with an example.

**Ans** A species is a group of organisms which can interbreed freely among them and produce fertile offsprings, but are reproductive isolated from all other such groups in nature e.g., human.

- (vi) What is meant by endangered species? Write an example.

**Ans** A species is called endangered when it is at risk of extinction in near future e.g., lion, tiger, Asiatic cheetah, Indian wild ass, Hangul, etc.



(vii) What is difference between primary and secondary walls of cell wall of plants?

**Ans** The outer layer of plant cell wall is known as primary wall and cellulose is the most common chemical in it. Some plant cells, for example, xylem cells, also have secondary walls on the inner side of primary wall. It is much thicker and contains lignin and some other chemicals.

(viii) Draw labeled diagram of mitochondrion.

**Ans**

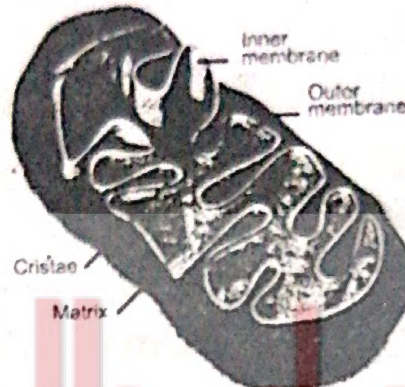


Fig. Mitochondrion.

**Q.3. Write short answers to any FIVE (5) questions: (10)**

(i) Explain G0 phase.

**Ans** In multicellular eukaryotes, cells enter G0 phase from G1 and stop dividing. Some cells remain in G0 for indefinite period e.g., neurons. Some cells enter G0 phase semi-permanently e.g., some cells of liver and kidney. Many cells don't enter G0 and continue to divide throughout organisms life e.g., epithelial cells.

(ii) Define mitosis.

**Ans** Mitosis is the type of cell division in which a cell divides into two daughter cells, each with the same number of chromosomes as were present in the parent cell.

(iii) What is crossing over?

**Ans** In prophase-I of MEIOSIS-I, the non-sister chromatids of homologous chromosomes exchange their segments and the phenomenon is known as crossing over.



(iv) Give uses of enzymes in paper industry.

**Ans** Enzymes break starch to lower viscosity that aids in making paper.

(v) Describe induced fit model.

**Ans** In 1958, an American biologist Daniel Koshland suggested a modification to "Lock and key" model and proposed induced-fit model. According to this model, active site is not a rigid structure rather it is molded into the required shape to perform its function. Induced-fit model is more acceptable than lock and key model.

(vi) What is Krebs cycle?

**Ans** The pyruvic acid molecules are completely oxidized, along with the formation of ATP, NADH and  $\text{FADH}_2$ . Before entering in Krebs cycle, pyruvic acid is changed into a 2-carbon compound called acetyl-COA.

(vii) Explain alcoholic fermentation.

**Ans** It occurs in bacteria, yeast, etc. In this type of anaerobic respiration, pyruvic acid is further broken down into alcohol ( $\text{C}_2\text{H}_5\text{OH}$ ) and  $\text{CO}_2$ .



(viii) Define bioenergetics.

**Ans** Bioenergetics is the study of energy relationships and energy transformation in living organisms.

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**Q.4. Write short answers to any FIVE (5) questions: (10)**

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(i) Differentiate between fat soluble and water soluble vitamins.

**Ans** Fat soluble vitamins are much less excreted from the bodies as compared to water soluble vitamins. This means that level of water soluble vitamins in the body can decrease more quickly leading to vitamin deficiency.

(ii) Write the name of two diseases caused by mineral deficiency.

**Ans** Following are the name of two diseases caused by mineral deficiency:



(iii) What is peristalsis?

**Ans** Peristalsis is defined as the waves of contraction and relaxation in the smooth muscles of alimentary canal walls.

(iv) What is protein-energy malnutrition?

**Ans** Protein-energy malnutrition means inadequate availability or absorption of energy and proteins in the body. It is the leading cause of death in children in developing countries. It may lead to diseases such as kwashiorkor and marasmus.

(v) Write preventive measures for dengue fever.

**Ans** Preventive measures for dengue fever are:

1. Don't let water stand in flower pots.
2. Regularly empty the refrigerator pan and spray the houses properly.

(vi) What is transpirational pull?

**Ans** Transpirational pull is principally responsible for the conduction of water and salts from roots to the aerial parts of the plant body. It can be created by the transpiration of pulling force.

(vii) Write the names of any two plasma proteins.

**Ans** Following are the two plasma proteins:

1. Antibodies
2. Fibrinogen

(viii) What is blood group systems?

**Ans** Blood group systems are the classification of blood based on the presence or absence of antigens on the surface of red blood cells.

### (Part-II)

**Note:** Attempt any TWO (2) questions.

**Q.5.(a)** Write down detail of two professions related to biology. (4)

**Ans** Professions related to biology

**Farming:**

It deals with the development and maintenance of different types of farm. For example, in some farms,



animal breeding technologies are used for the production of animals which are better protein and milk source. In poultry farms, chicken and eggs are produced. Similarly, in fruit farms, different fruit yielding plants are grown. A student who has gone through the professional course of agriculture, animal husbandry or fisheries, etc. can adopt this profession.

### **Forestry:**

In forestry, professionals look after natural forests and advise to the government for planting and growing artificial forests. Many universities offer professional courses in forestry after the higher secondary education in biology or after bachelor level study of zoology and botany.

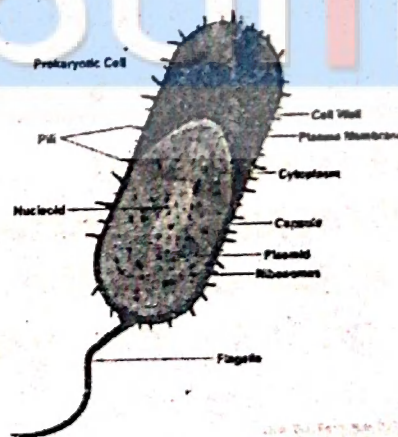
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**(b) Write five differences between prokaryotes and eukaryotes. (5)**

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### **Ans Prokaryotic and Eukaryotic cells:**

Prokaryotes possess prokaryotic cells which are much simpler than the eukaryotic cells. The main differences between prokaryotic and eukaryotic cells are as follows:



### **Nucleus:**

Eukaryotic cells have prominent nucleus (bounded by nuclear envelope) while prokaryotic cells do not have prominent nucleus. Their chromosome consists of DNA only and it floats in cytoplasm near centre. This region is called nucleoid.



## Other Organelles:

Eukaryotic cells have membrane-bounded organelles like mitochondria, Golgi apparatus, endoplasmic reticulum, etc., while such membrane-bounded organelles are not present in prokaryotic cells.

The ribosomes of eukaryotic cells are larger in size as compared to the ribosomes of prokaryotic cells.

### Size:

Eukaryotic cells are, on average, ten times larger than prokaryotic cells.

### Cell Wall:

The cell wall of eukaryotic cell is made of cellulose (in plants) or chitin (in fungi). All prokaryotic cells have cell wall, which is made of peptidoglycan (a large polymer of amino acids and sugars).

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### Q.6.(a) Write a note on specificity of enzymes. (4)

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**Ans** Enzymes are specific in their function. Each enzyme acts on a specific substrate. For example, proteases only act on proteins. Similarly, the lipases act on lipids only and convert them into fatty acids and glycerol. The specificity of enzymes is determined by the shapes of their active sites. The active site has a specific geometrical shape. Due to which each enzyme fits to a specific substrate.

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### (b) Describe the mechanisms of respiration. (5)

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**Ans** Mechanism of respiration:

The process of respiration involves complex series of reactions. For the study of all the reactions of glucose oxidation, we will go into the mechanism of aerobic respiration.

Aerobic respiration is a continuous process, but for convenience we can divide it into three main stages:

1. Glycolysis
2. Krebs cycle
3. Electron transport chain



1. **Glycolysis** occurs in cytoplasm and oxygen is not involved in this stage. That is why, it occurs in both types of respiration *i.e.*, aerobic and anaerobic. In glycolysis, glucose (6C) molecule is broken into two molecules of pyruvic acid (3C).

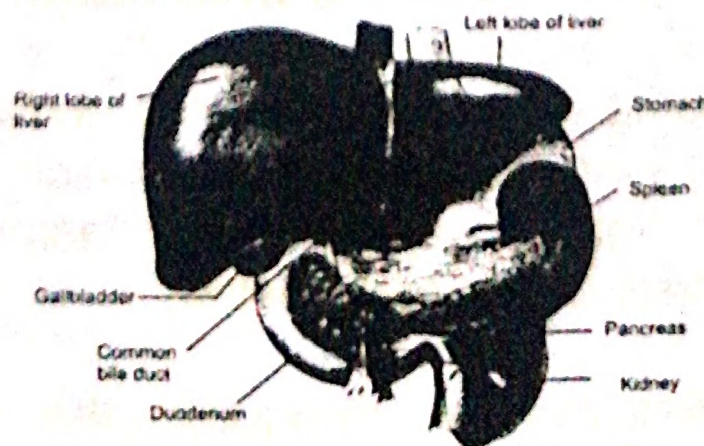
2. In **Krebs cycle**, the pyruvic acid molecules are completely oxidized, along with the formation of ATP, NADH and  $\text{FADH}_2$ . Before entering in Krebs cycle, pyruvic acid is changed into a 2-carbon compound called acetyl-CoA.

3. **Electron transport chain** is the final step of cellular respiration. It is the transfer of electron transport chain. In this step, NADH and  $\text{FADH}_2$  release electrons and hydrogen ions. These electrons are taken up by a series of electron carriers. When electrons move through the series of electron carriers they lose energy, which is used to synthesize ATP. At the end of chain, electrons and hydrogen ions combine with molecular oxygen and form water.

**Q.7.(a) Describe the role of liver in human body. (4)**

**Ans** **Role of Liver:**

Liver is the largest gland of body. It is multi-lobed and dark reddish in appearance. It lies beneath the diaphragm on the right side of abdomen. In an adult human, it weighs about 1.5 kg and is the size of a football. A pear-shaped greenish-yellow sac *i.e.*, gall bladder lies along the right lobe of liver on ventral side.



**Fig. Liver and associated organs**



Liver secretes bile, which is stored in gall bladder. When gall bladder contracts, bile is released into duodenum through common bile duct. Bile has no enzyme but contains bile salts from emulsion of lipids. It helps the lipid digestion enzymes to attack on lipids. Besides digestion, liver carries out a number of other functions, some of which are summarized here:

1. Removes amino group from amino acids (de-amination).
2. Converts ammonia to a less toxic form *i.e.*, urea.
3. Destroys the old red blood cells.
4. Manufactures blood clotting proteins called fibrinogen.
5. Converts glucose into glycogen and, when required, breaks glycogen into glucose.
6. Converts carbohydrates and proteins into lipids and produces cholesterol.
7. Produces heat to maintain body temperature.
8. Stores fat-soluble vitamins (A, D, E and K) and mineral ions, such as iron.

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**(b) Define the term transpiration and describe the factors affecting the rate of transpiration. (5)**

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**Ans** **Transpiration:**

Transpiration is the loss of water from plant surface through evaporation. This loss may occur through stomata in leaves, through the cuticle present on leaf epidermis, and through special openings called lenticels present in the stems of some plants X.

**Factors affecting the rate of transpiration:**

The rate of transpiration is directly controlled by the opening and closing of stomata and it is under the influence of light. In strong light, the rate of transpiration is very high as compared to dim light or no light. Other factors which affect the rate of transpiration are given below:

**Temperature:**

Higher temperature reduces the humidity of surrounding air and also increases the kinetic energy of



water molecules. In this way, it increases the rate of transpiration. The rate of transpiration doubles with the every rise of  $10^{\circ}\text{C}$  in temperature. But very high temperature i.e.,  $40-45^{\circ}\text{C}$  causes closure of stomata. So transpiration stops and plant does not loose water.

### **Air humidity:**

When air is dry, water vapours diffuse more quickly from the surface of mesophyll cells into leaf air spaces and then from air spaces to outside. This increases the rate of transpiration. In humid air, the rate of the diffusion of water vapours is reduced and the rate of transpiration is low.

### **Air movement:**

Wind carries away the evaporated water from leaves and it carries an increase in the rate of evaporation from the surface of mesophyll cells. When air is still, the rate of transpiration is reduced.

### **Leaf surface area:**

The rate of transpiration also depends upon leaf surface area. More surface area provides more stomata in epidermis and increase in rate of transpiration.